



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/705,506	11/12/2003	Tetsuo Take	32307-198662	1163
26694	7590	12/01/2006	EXAMINER	
VENABLE LLP			MERCADO, JULIAN A	
P.O. BOX 34385			ART UNIT	
WASHINGTON, DC 20043-9998			PAPER NUMBER	

1745

DATE MAILED: 12/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/705,506

Applicant(s)

TAKE, TETSUO

Examiner

Julian Mercado

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 and 12-47 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-9 and 12-47 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received. (not scanned)
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 2003-11-12.

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: ____.

Art Unit: 1745

DETAILED ACTION

Remarks

The July 14, 2004 preliminary amendment has been entered.

Claims 1-9 and 12-47 are pending.

Information Disclosure Statement

The Information Disclosure Statement filed on November 12, 2003 has been considered by the examiner.

Specification

The disclosure is objected to because of the following informalities: On page 12 at line 1, it is suggested to change "remaininder" to --remainder--.

The lengthy specification totaling 133 pages has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Art Unit: 1745

Claims 7-9, 36-39, 40-43, and 44-47 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claims 7-9 each recite in line 3 et seq. as follows:

first power generating means for producing a reformed gas containing hydrogen at an anode by a steam reforming reaction of a fuel and generating power by electrochemical reaction of hydrogen or hydrogen and carbon monoxide in said reformed gas with oxygen...

Giving this limitation its interpretation under 35 U.S.C. 112, sixth paragraph, it appears to the examiner that the means-plus-function feature has *both* 1) a power generating means for producing a reformed gas and 2) a means for generating power by electrochemical reaction. 35 U.S.C. 112, sixth paragraph states that a claim limitation expressed in means-plus-function language “shall be construed to cover the corresponding structure...described in the specification and equivalents thereof.” As such, upon review of applicant’s disclosure it is the examiner’s position that there is no corresponding *single* structure disclosed in the specification that performs *both* the production of a reformed gas and generating power by electrochemical reaction. It appears to the examiner that performing each of these functions is done separately by, e.g. a reformer and a fuel cell, respectively. Furthermore, refer to line 6 of the claim, where the first power generating means is claimed to consume heat (i.e. is endothermic), while line 8 recites “said heat resulting from said power generation” (i.e. is exothermic). From the standpoint of thermodynamic feasibility, it is not understood how a single structure implied as by “a power generating means” can be both endothermic and exothermic. It therefore appears that two distinct means—the first being a reformer which is endothermic and

Art Unit: 1745

the second a fuel cell which is exothermic, is being simultaneously claimed by the first power generating means. For the foregoing reasons, a power generating means capable of both functionalities is not found enabled.

Claims 36-39, 40-43, and 44-47 are rejected under 35 U.S.C. 112, first paragraph as being dependent upon a rejected base claim.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 7-9, 36-39, 40-43, and 44-47 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The means-plus-function language in line 3 et seq. is discussed above. Giving this limitation its 35 U.S.C. 112, sixth paragraph interpretation as described in the specification and equivalents thereof, as applicant has not set forth an adequate disclosure for a corresponding *single* structure disclosed in the specification that performs *both* the production of a reformed gas and generating power by electrochemical reaction, in effect applicant has failed to particularly point out and distinctly claim the invention as required by the second paragraph of section 112. *In re Donaldson Co.*, 16 F.3d 1189, 1195, 29 USPQ2d 1845, 1850 (Fed. Cir. 1994) (in banc)

For purposes of claim interpretation, the instant first power generating means is interpreted as a means for producing a reformed gas and a means for generating power by electrochemical reaction, structurally corresponding to a reformer and a fuel cell as disclosed in the specification.

Art Unit: 1745

Claims 36-39, 40-43, and 44-47 are rejected under 35 U.S.C. 112, second paragraph as being dependent upon a rejected base claim.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 4, 5, 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Xu (U.S. Pat. 6,551,732 B1) in view of Morimoto et al. (U.S. Pat. 5,221,586).

Claims 1-9 are independent claims. Claim 2, being the broadest claim, will be discussed first. Regarding claim 2, Xu teaches a fuel cell power generating system for generating power by electrochemical reaction of hydrogen with oxygen, comprising a reforming means [6] for producing a reformed gas containing hydrogen by a steam reforming reaction of a fuel. Reference character [3] is specifically disclosed as a fuel cell and thus readable on both the claimed first power generating means [3] for generating power by electrochemical reaction of hydrogen or hydrogen and carbon monoxide in said reformed gas with oxygen, and the first power generating means for supplying waste heat and steam resulting from said power generation to said reforming means, see col. 3 line 56 et seq. as follows:

The present invention teaches use of the cathode effluent gas that contains residual oxygen and water vapor (as well as inert gas such as nitrogen and argon) as a feed to the fuel processor for partial oxidation or preferably for autothermal reforming to transform the fuel into hydrogen containing gas usable in the fuel cell reaction, so that part of the waste heat in the fuel cell can be recovered in the form of water vapor for use in fuel cell processing.

Art Unit: 1745

Xu further teaches a converting means [7], i.e. “water-gas shift reactor”, for converting carbon monoxide in said reformed gas into carbon dioxide and hydrogen by reaction of said carbon monoxide with steam. See col. 5 line 60 et seq.

Claim 1 is notably modeled after claim 2 with the additional recitation of an oxidizing means. Xu teaches oxidizing means [8], i.e. “preferential oxidation reactor”, for converting carbon monoxide ejected from said converting means into carbon dioxide by oxidation.

Claim 4 is notably modeled after claim 1 and claim 5 modeled after claim 2, each with the additional recitation of an emission containing steam resulting from said power generation to said reforming means. Refer to the cited portion of Xu as discussed above (col. 3 line 56 et seq.) which specifically discloses steam, i.e. “water vapor” from the cathode effluent.

To the extent that the claims are understood and believed enabled for the reasons set forth under 35 U.S.C. 112, first and second paragraph (discussions above), claims 7 and 8 appear to be modeled after claims 4 and 2, respectively, with exception to the claimed reforming means. It is asserted that the first power generating means as claimed in claims 7 and 8 is taught by Xu in the form of a reforming means [6] for producing a reformed gas containing hydrogen, and a fuel cell [3] as the power generating means.

Xu does not explicitly teach a second power generating means for generating a power. by electrochemical reaction of hydrogen ejected from said oxidizing means with oxygen. However, Morimoto et al. teaches a second power generating means, i.e. a second fuel cell. The skilled artisan would find obvious to modify Xu’s invention by employing a second power generating means. The motivation for such a modification would be to improve the efficiency of

Art Unit: 1745

the fuel cell system, i.e. “a total fuel utilization factor is improved as compared with a power generating system having a single fuel cell.” See Morimoto et al. in col. 5 line 3 et seq.

Claims 3, 6 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Xu in view of Morimoto et al. as applied to claims 1, 2, 4, 5, 7 and 8 above, and further in view of Gagnon (U.S. Pat. 4,098,960)

The teachings of Xu and Morimoto et al. are discussed above.

Claim 3 is notably modeled after claim 2 and claim 6 after claim 3, each with the additional recitation of a separating means for separating hydrogen from an emission of said converting means. To the extent that claim 9 is understood and believed enabled for the reasons set forth under 35 U.S.C. 112, first and second paragraph (discussions above), the first power generating means is taught by Xu in the form of a reforming means [6] for producing a reformed gas containing hydrogen and a fuel cell [3] as the power generating means. While Xu does not explicitly teach a separating means, Gagnon teaches the claimed means in the form of a “hydrogen condenser” which separates water from the hydrogen effluent from a shift converter. See col. 3 lines 52-59. The skilled artisan would find obvious to further modify Xu by employing a separating means for separating hydrogen from an emission of said converting means in order to deliver pure hydrogen to the fuel cell. (ib.)

Claims 12-19, 24-31 and 36-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Xu in view of Morimoto et al. as applied to claims 1, 2, 4, 5, 7 and 8 above, and further in view of Scheffler et al. (U.S. Pat. 4,859,545).

Art Unit: 1745

The teachings of Xu and Morimoto et al. are discussed above.

As to claims 12, 13, 16, 17, 24, 25, 28, 29, 36, 37, 40 and 41, Xu and Morimoto et al. do not explicitly teach a means for determining whether an output power of a first or second power generating means increases or decreases; and means for decreasing an amount of air supplied to said first or second power generating means when said output power of said first or second power generating means increases, or increasing said amount of said air when said output power of said first power generating means decreases. However, Scheffler et al. teaches a means for determining whether an output power of a power generating means increases or decreases in the form of a "power plant microprocessor control" [34] working in conjunction with a means for decreasing an amount of air such as "air inlet valve" [32]. See col. 2 line 44 et seq. The skilled artisan would find obvious to further modify Xu's invention by employing the microprocessor control and air inlet valve as taught by Scheffler et al. The motivation for such a modification would be to minimize the incidence of cell starvation, as taught by Scheffler et al. in col. 1 line 48 et seq.

Claims 14, 15, 18, 19, 26, 27, 30, 31, 38, 39, 42, 43 are method claim analogues of claims 12, 13, 16, 17, 24, 25, 28, 29, 36, 37, 40, and 41, respectively, and are therefore rejected on the same grounds insofar as the functional language of the means-plus-function limitations are readable thereto.

Claims 20, 21, 32, 33, 44 and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Xu in view of Morimoto et al. and Gagnon as applied to claims 3, 6 and 9 above, and further in view of Scheffler et al. (U.S. Pat. 4,859,545).

The teachings of Xu, Morimoto et al. and Gagnon are discussed above. The rejection further in view of Scheffler et al. parallel the reasons set forth in the immediately preceding paragraph, repeated herein in its entirety.

As to claims 20, 21, 32, 33, 44 and 45, Xu and Morimoto et al. do not explicitly teach a means for determining whether an output power of a first or second power generating means increases or decreases; and means for decreasing an amount of air supplied to said first or second power generating means when said output power of said first or second power generating means increases, or increasing said amount of said air when said output power of said first power generating means decreases. However, Scheffler et al. teaches a means for determining whether an output power of a power generating means increases or decreases in the form of a “power plant microprocessor control” [34] working in conjunction with a means for decreasing an amount of air such as “air inlet valve” [32]. See col. 2 line 44 et seq. The skilled artisan would find obvious to further modify Xu’s invention by employing the microprocessor control and air inlet valve as taught by Scheffler et al. The motivation for such a modification would be to minimize the incidence of cell starvation, as taught by Scheffler et al. in col. 1 line 48 et seq. It is further asserted that such a modification would be desired in both the first and second power generating means, as rendered obvious by the teachings of Morimoto et al.

Claims 22, 23, 34, 35, 46 and 47 are method claim analogues of claims 20, 21, 32, 33, 34, 44 and 45, respectively, and are therefore rejected on the same grounds insofar as the functional language of the means-plus-function limitations are readable thereto.

Art Unit: 1745

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Julian Mercado whose telephone number is (571) 272-1289. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan, can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.



jam



PATRICK JOSEPH RYAN
SUPERVISORY PATENT EXAMINER